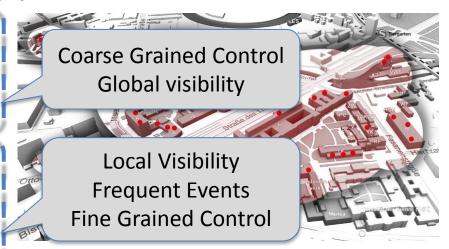
# AeroFlux: A Near-Sighted Controller Architecture for Software-Defined Wireless Networks

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#### WiFi needs SDN!

- Network services as applications
  - Channel Selection
  - Mobility Management
  - Client Load Balancing
  - WIDS/WIPS Systems
  - Traffic aware TX control
    - Per-flow TX settings
    - e.g., PHY rate, retry, power



### The Case for Near-Sighted Controller

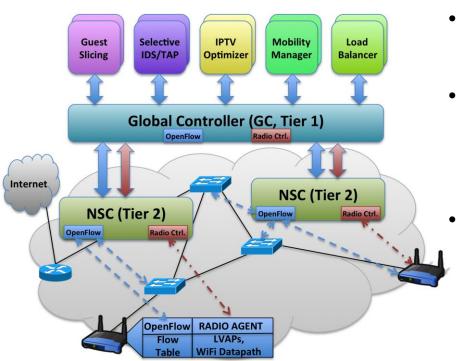
- Fine grained control
  - Transmission settings on a per-slice, per-client, and per-flow level
  - Traffic and application aware transmission control
  - E.g., live video streaming optimizations through adaptive (Direct) multicast strategies
- Approach: handle frequent, localized events close to their origin

#### SDN for WiFi

- OpenFlow (OF) for the integration with wired part
- OF enabled Access Points (APs)
- Separate south-bound interface for WiFi
- Global Controller based on Odin<sup>1</sup>
- Near-Sighted Controller close to the APs
- WiFi specific Agents on APs handle
  - Light Virtual Access Points (per client state)
  - WiFi datapath transmission entries

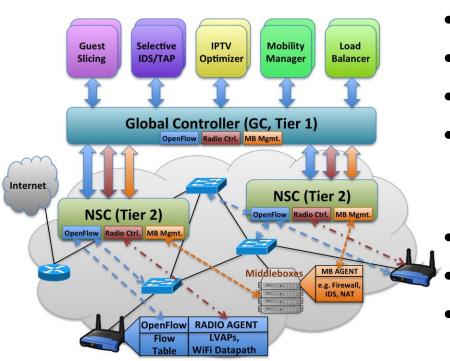
<sup>&</sup>lt;sup>1</sup>L. Suresh, J. Schulz-Zander, R. Merz, A. Feldmann, and T. Vazao. Towards programmable enterprise WLANS with Odin. In *HotSDN '12*.

#### Architecture



- Global Controller for coarse-grained control
  - Services that require global visibility
  - Middlebox handling beneficial
- Near-sighted controller for fine grained control
  - Latency-critical and load-intensive tasks
  - Per-Flow transmission settings
  - Transmission statistic collection
- Radio Agent exposes all functionalities
  - LVAP abstraction
  - Handles WiFi Datapath entries
  - Provide interface for statistic collection.

## Use Case: Live Video Streaming



- Live video multicast stream
- Match through OF rule
- Redirected to Middlebox
- Differentiation
  - Keyframes
  - Interframes
- WiFi DP rule for each subflow
- Transmit keyframes more robust
- Challenge: Frame Aggregation

#### **Current State**

- Global Controller
- Datapath Element tested
- Proof of concept NSC
- Near-Sighted Controller is work in progress
- Deployment ongoing (Lab deployment)
- Deployment in production network planned for this Summer